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(71)Applicant : FUJITSU LTD

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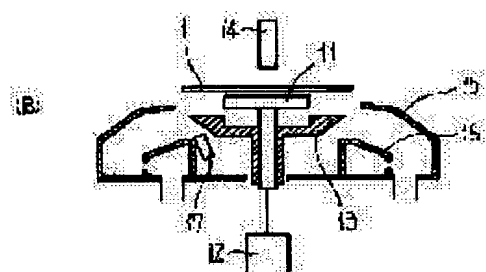
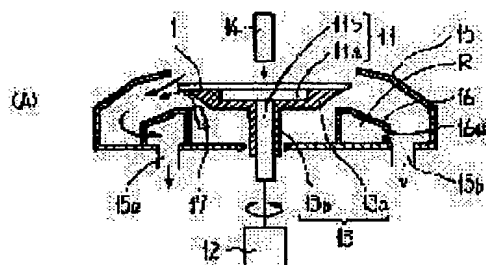
(72)Inventor : NAGAI KOICHI

(54) RESIST COATING DEVICE

(57)Abstract:

PURPOSE: To prevent adhesion of resist splash to the back side of a substrate without impairing the uniformity of the coating thickness in connection with a structure of device for spin-coating the substrate with resist.

CONSTITUTION: A coating body 13 which has a head 13a of larger diameter than the attracting portion 11a of a chuck 11, and is interlocked moderately with the shaft portion 11b of the chuck 11 is provided. The coating body 13 can move vertically, and apply resist from the lower side to the exposed portion of the back side of a substrate which is attracted and held horizontally by the chuck 11. The coating body 13 is made to fall down at the time of transferring the substrate 1.



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CLAIMS

[Claim(s)]

[Claim 1] Substrate characterized by providing the following (1) Equipment which applies a resist to a front face. This substrate (1) The adsorption section of a minor diameter (11a) Chuck which it has (11) It can move in the vertical direction freely, and this chuck (11) is this adsorption section (11a). This substrate that carries out adsorption maintenance horizontally in a top (1) Covering object which covers this in contact with a rear-face outcrop from a lower part (13)

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the structure of the resist coater used for manufacture of a semiconductor device etc. In the manufacturing process of a semiconductor device, after applying a resist on a wafer, the processing which exposes and develops this and obtains a resist pattern is repeated. Among these, the coater of a rotation application method which acquires the homogeneity of an application film is used for a resist application by carrying out high-speed rotation of the wafer.

[0002] If detailed-ization of a pattern is advanced corresponding to the demand of high accumulation and densification, therefore a semiconductor device is in a resist coater in recent years, no foreign matter adhesion in the wafer side constituting the cause of a focal gap at dispersion and the exposure process of the application thickness which degrades pattern precision is wanted for there to be etc.

[0003]

[Description of the Prior Art] An example of the conventional resist coater is explained referring to drawing 2 . Drawing 2 is the cross section showing the conventional example, and shows the state at the time of a resist application. The same sign was given to the same thing as drawing 1 in this drawing. 1 — the substrates (semiconductor wafer etc.) of a coated material, and 11 — for a resist nozzle and 15, a cup and 16 are [a chuck and 12 / a rotation means and 14 / a rinse nozzle and R of a partition ring and 17] ring-like space

[0004] In order to apply a resist to a substrate 1 by this resist coater, a substrate 1 is made to stick to a chuck 11 first, a resist is dropped on a substrate 1 from the resist nozzle 14, the rotation means 12 is operated, and a substrate 1 is rotated with a chuck 11. Under the present circumstances, while an excessive resist disperses, a fog-like droplet (it is hereafter described as resist Myst) occurs. Moreover, the resist which the 1 round edge of substrates is made to turn and breathe out a rinse from the rinse nozzle 17, and turns to a rear face is washed. While dropping gently the pure air by which temperature control was carried out from the substrate 1 upper part in the meantime, it is exhaust-port 15a about the inside of the ring-like space R. Shell exhaust air is carried out. Consequently, this air is bleeder 16b in to [near the substrate 1 periphery] resist Myst. It goes and is exhaust-port 15a. Shell exhaust air is carried out. In addition, the waste fluid of a resist and a rinse is effluent mouth 15b. Shell eccrisis is carried out.

[0005]

[Problem(s) to be Solved by the Invention] However, in such a conventional resist coater, it is difficult to discharge all generated resist Myst with the air current to an exhaust port from from near [above-mentioned] the substrate periphery, and a part turns to the rear face of a substrate. Although resist Myst does not adhere since a rinse is applied to the substrate rear-face periphery section, it adheres to a part for the outcrop of the inside. If resist Myst adheres to the rear face of a substrate, it will become causes, such as contamination of a facility at a subsequent process, and raising dust, a focal gap at the time of exposure. If the inside of a cup is exhausted more powerfully, although adhesion of this resist Myst can be reduced, in this case,

among the air currents on the resist application side of a substrate, speed is especially gathered by the periphery, and evaporation of a resist solvent is promoted, consequently the homogeneity of application thickness is spoiled, and the precision of a resist pattern is reduced. There were the above problems in the conventional resist coater.

[0006] It aims at offering the resist coater which can prevent adhesion of resist Myst on the rear face of a substrate, without this invention's solving such a problem and spoiling the homogeneity of application thickness.

[0007]

[Means for Solving the Problem] It is considering as the resist coater characterized by to have the covering object which covers this from a lower part in contact with the rear-face [move / freely / and / this purpose is equipment which applies a resist on the surface of a substrate according to this invention, and / in the chuck which has the adsorption section of a minor diameter from this substrate, and the vertical direction / it] outcrop of this substrate that carries out adsorption maintenance horizontally / this chuck / on this adsorption section, and is attained.

[0008]

[Function] In the resist coater of this invention, since the rear face of a substrate is being worn with a chuck and a covering object at the time of a resist application and the amount of outcrop is not, even if the exhaust air in a cup is weak and there is much suspension of resist Myst, resist Myst does not adhere to a substrate rear face even if. Moreover, since the air current by the side of a substrate front face is not disturbed by establishing this covering object, the homogeneity of application thickness is not spoiled. Moreover, at the time of substrate conveyance, it has evacuated caudad, and this covering object does not bar substrate conveyance.

[0009] The resist coater of this invention becomes possible [preventing adhesion at the substrate rear face of resist Myst] from the above thing, without spoiling the homogeneity of thickness.

[0010]

[Example] The example of the resist coater concerning this invention is explained referring to drawing 1 . Drawing 1 is the cross section showing the example of this invention, and is (A). About the state at the time of a resist application, it is (B). The state at the time of substrate conveyance is shown, respectively. For a resist nozzle and 15, in this drawing, a cup and 16 are [a rotation means for the chuck to which 1 carries out the substrates (semiconductor wafer etc.) of a coated material, and 11 carries out vacuum adsorption of the substrate 1, and 12 to consist of a motor etc., and to rotate a chuck 11, and 13 / a covering object and 14 / a rinse nozzle and R of a partition ring and 17] ring-like space.

[0011] disc-like adsorption section 11a with a level chuck 11 Perpendicular shank 11b from — it becomes the adsorption which carries out opening of the adsorption section 11a to the upper surface — it has the hole, and the outer diameter is sharply smaller than the outer diameter of a substrate 1 (in order to secure the space for substrate conveyance) head 13a of reverse truncated-cone type [object / covering / 13] Perpendicular hollow shaft section 11b from — it becomes This hollow shaft section 11b Shank 11b of a chuck 11 It has fitted in gently, therefore can be slid on the covering object 13 up and down to a chuck 11.

[0012] Head 13a of the covering object 13 It has adsorption section 11a of a chuck 11, and the crevice which fits in, and the base of this crevice is adsorption section 11a of a chuck 11. It is in the state which contacted and is head 13a of the upper surface of adsorption section 11a of a chuck 11, and the covering object 13. The upper surface turns into the same flat surface. this head 13a **** — the adsorption which carries out opening to the upper surface — it has the hole This head 13a It is slightly small in whether an outer diameter is equal to the outer diameter of a substrate 1. When a substrate 1 is a semiconductor wafer, it is slightly small in whether it is the same as the diameter of circle which is the outer diameter and this heart, and is inscribed in the orientation flat.

[0013] A cup 15 surrounds the side of a substrate 1 and holds the excessive resist which disperses at the time of rotation of a substrate 1. In the cup 15, it divided on the base, and the

ring 16 has fixed. This partition ring 16 forms the nothing and ring-like space R for the shape of a hollow ring. Bleeder 16b which allotted many stomata to the paries lateralis orbitae of the partition ring 16 in the shape of a ring It is prepared. Exhaust-port 15a which divides into cup 15 base and leads under a ring 16 in the ring-like space R In outside [ring / partition / 16] approach, it is effluent mouth 15b. It is prepared, respectively. Exhaust-port 15a It is open for free passage for the exhaust air means (illustration is omitted).

[0014] The state where the cup 15 was first lowered in order to have applied the resist to the substrate 1 by this resist coater (refer to drawing 1 (B)) A substrate 1 is conveyed on a chuck 11 and it is made to stick to this. next, the covering object 13 is gone up — making — head 13a the substrate 1 rear-face outcrop was made to contact — after vacuum adsorption is carried out, this is covered, and a cup 15 is raised further Then, a resist is dropped on a substrate 1 from the resist nozzle 14, the rotation means 12 is operated, a substrate 1 is rotated (since the covering object 13 is adsorbing the substrate 1, the covering object 13 also rotates with a chuck 11), and the resist which the 1 round edge of substrates is made to turn and breathe out a rinse from the rinse nozzle 17, and turns to a rear face is washed. Under the present circumstances, while dropping gently the pure air by which temperature control was carried out from the substrate 1 upper part, it is exhaust-port 15a about the inside of the ring-like space R. Shell exhaust air is carried out. Consequently, this air is bleeder 16b in resist Myst. It goes and is exhaust-port 15a. Shell exhaust air is carried out. In addition, the waste fluid of a resist and a rinse is effluent mouth 15b. Shell eccrisis is carried out.

[0015] Thus, as a result of applying a resist to a substrate 1, adhesion of resist Myst to substrate 1 rear face was lost. Without being limited to the above example, it can deform variously further and this invention can be carried out. for example, head 13a of the covering object 13 the upper surface — adsorption — a hole — not preparing — hollow shaft section 13b **** — the pin which projects in a centrum — shank 11b of a chuck 11 By preparing a fluting outside, respectively and making these engaged, this invention is effective also as structure of rotating the covering object 13 with a chuck 11.

[0016]

[Effect of the Invention] Without spoiling the homogeneity of application thickness according to this invention, as explained above, the resist coater which can prevent adhesion of resist Myst on the rear face of a substrate can be offered, and it contributes to the improvement in the yield in semiconductor device manufacture etc.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross section showing the example of this invention.

[Drawing 2] It is the cross section showing the conventional example.

[Description of Notations]

1 Substrate

11 Chuck

11a Adsorption section

11b Shank

12 Rotation Means

13 Covering Object

13a Head

13b Hollow shaft section

14 Resist Nozzle

15 Cup

15a Exhaust port

15b Effluent mouth

16 Partition Ring

16a Bleeder

17 Rinse Nozzle

R Ring-like space

[Translation done.]